

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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In Re Application of:	Matthew M. Terry	Docket No.:	3053.136.US
Serial No.:	10/526,416	Confirmation No.:	3094
Filing Date:	03/02/2005	Examiner:	S. Johnson
Customer No.:	26474	Art Unit:	3641

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For: *BLAST AND BALLISTIC PROTECTION SYSTEMS AND METHODS OF MAKING SAME*

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Honorable Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

APPEAL BRIEF UNDER 37 C.F.R. § 41.37

Sir:

This is an appeal from the final rejection of claims 1 – 9, 12 – 14, 16 and 38, in the Office action mailed October 1, 2007. A Notice of Appeal was timely filed on February 1, 2008.

The fee of \$255.00 set forth in 37 C.F.R. § 41.20(b)(2) is paid by credit card. Please charge any shortage in fees due in connection with the filing of this paper, including Extension of Time fees, to Deposit Account 14.1437. Please credit any excess fees to such account.

REAL PARTY IN INTEREST:

The real party in interest is University of Virginia Patent Foundation of Charlottesville, VA.

RELATED APPEALS AND INTERFERENCES:

There are no related appeals which may have affect, be affected by, or have a bearing on the Board's decision in the present appeal.

STATUS OF CLAIMS:

- Claims 1 – 38 are pending in the application.
- Claims 1 – 9, 12 – 14 and 16 – 38 stand rejected.
- Claims 10, 11 and 15 have been withdrawn from consideration on the merits as allegedly being directed to a non-elected species.
- No claims are allowed.
- No claims are canceled.

STATUS OF AMENDMENTS:

No proposed amendment subsequent to the final rejection mailed October 1, 2007 has been filed.

SUMMARY OF CLAIMED SUBJECT MATTER:

The invention according to independent claim 1 relates to a protection structure comprising:

- open cell core structure (core 21, Figs. 1-4, paragraphs 0016, 0017, 0023 of the application as published);
- a top face sheet coupled to said core structure (face sheet 22, Figs. 1-4, ¶ 0018);
- a bottom face sheet coupled to said core structure distal from said top face sheet (face sheet 23, Figs. 1-4, ¶ 0018);
- a projectile arresting layer coupled to said top face sheet distal from said

core structure (arresting layer 51, Figs. 1, 3, 4, ¶¶ 0017 - 0018); and

- a fragment catching layer coupled to said bottom face sheet distal from said core (catching layer 71, Figs. 1, 2, 4, ¶¶ 0018, 0024).

The invention according to independent claim 2 is similar to claim 1, except requiring a projectile arresting structure disposed inside said core structure instead of coupled to the top face sheet. This is shown in Figs. 3 and 4 as ceramic material 24, ¶ 0018 of the published specification.

The invention according to independent claim 3 also is similar to claim 1, except requiring a fragment catching structure disposed inside said core instead of coupled to the bottom face sheet. This is shown in Figs. 2 and 4 as ballistic fiber 25, ¶¶ 0018, 0023 of the published specification.

The invention according to independent claim 5 also is similar to claim 1, except requiring a fragment catching structure disposed inside said core and a fragment catching layer coupled to said bottom face sheet distal from said core instead of only being coupled to the bottom face sheet. This is shown in Figs. 3 and 4 as ballistic fiber 25 and ballistic fiber fabric 71, ¶¶ 0018, 0023, 0024 of the published specification.

The invention according to independent claim 7 also is similar to claim 1, except requiring a projectile arresting structure disposed inside said core structure instead of being coupled to a top face sheet, and a fragment catching structure disposed inside said core instead of being coupled to the bottom face sheet. This is shown in Fig. 4 as arresting ceramic material 24 and ballistic fiber 25, ¶¶ 0018 and 0023 of the published specification.

The invention according to independent methods claims 26-28, 30 and 32 is analogous to article claims 1-3, 5 and 7 and is described in the specification and drawings at the same passages cited above.

The independent claims involved in the appeal are claims 1, 2, 3, 5, 7, 26-28, 30 and 32. Summary of the subject matter of the dependent claims is omitted as unnecessary.

GROUND OF REJECTION TO BE REVIEWED ON APPEAL:

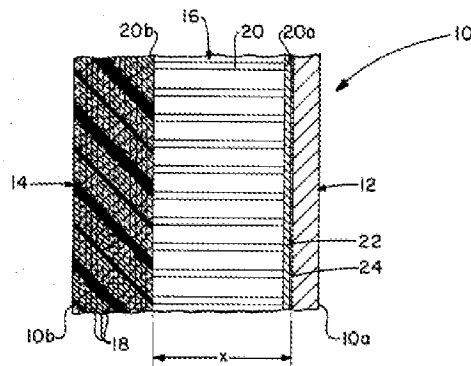
- I. Whether Claims 1, 8/1, 81/1, 19/1 20/1 and 26 are unpatentable under 35 U.S.C §102(b) as being anticipated by Brown et al., U.S. Patent No. 4,529,640 (hereinafter, “Brown”) and are properly rejected on that basis;
- II. Whether Claims 1-9, 12-14, 16, 18-21 and 23-38 are unpatentable under 35 U.S.C §102(b) as being anticipated by Groves, U.S. Patent No. 5,110,661 and are properly rejected on that basis; and
- III. Whether Claims 17 and 22 are unpatentable 35 U.S.C §103(a) as being obvious over Groves in view of Tippett, U.S. Pub. No. 2001/0030023, and are properly rejected on that basis.

ARGUMENT:

Regarding Rejection I:

Appellants respectfully submit that the rejection of claims 1, 8/1, 18/1, 19/1, 20/1 and 26 as being anticipated by Brown is in error and should be reversed.

Brown discloses a composite armor structure having a layer of hard steel 12, an aluminum alloy sheet 22, a paper honeycomb spacer 20, and a ballistic woven fabric layer 18, as reproduced below:



The Office action improperly interprets ballistic layer 18 as corresponding to both the claimed bottom face sheet and the separately claimed fragment catching layer. This interpretation violates the Doctrine Against Double Inclusion, which prohibits a

single element of the prior art from being applied to separately claimed elements that are separately disclosed in an application. See, e.g., Ex parte Kristensen, 10 USPQ2d 1701 (Bd. Pat. App. & Inter. 1989) (where a claim directed to a device can be read to include the same element twice, the claim may be indefinite).

The Office action asserts in response that “one” of the “multiple layers” of ballistic fabric 18 would be the “bottom face sheet” and “the other” of which would be the “fragment catching layer.” Such interpretation is improper, however, because Brown does not disclose that separate plies of the fabric 18 have separate functionality as claimed. To the contrary, the multi-ply inner element 14 is disclosed as a single element, made of multiple plies of ballistic fabric 18 impregnated in a resin matrix, such as an epoxy, polyester, or polyvinyl butyl resin matrix. Col. 2, ll. 12-16. As such, the element 14 for all intents and purposes is disclosed as a single layer having a single functionality, and would so be understood by those of ordinary skill in the art according to the unambiguous disclosure of Brown. In contrast, the claimed invention requires a separately identifiable bottom face sheet and fragment catching layer. Here, the bottom face sheet as claimed is disclosed as face sheet 23, and the fragment catching layer as claimed is disclosed as separate ballistic layer 71:

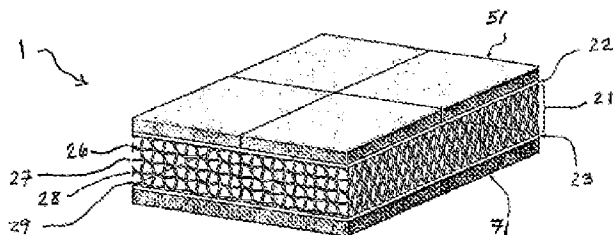


FIG. 1

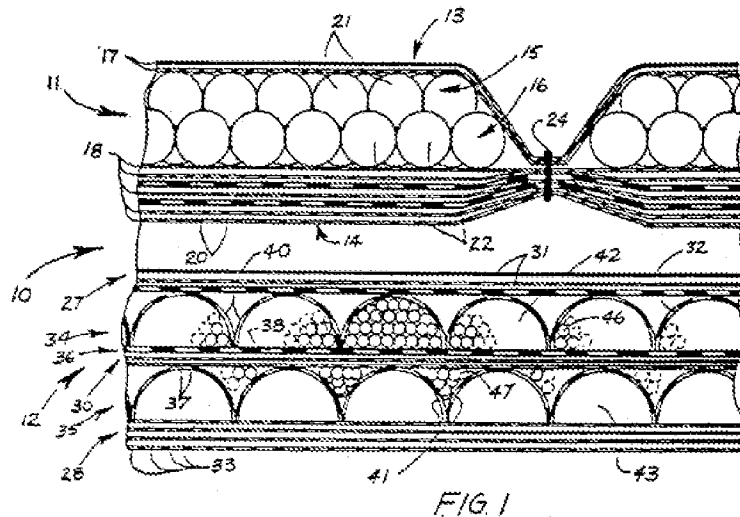
There is no basis in Brown from which one skilled in the art would discriminate individual plies of the single impregnated resin matrix of woven fabric 18. The only basis on the record for the interpretation of Brown appears to be from reading the present application.

Consequently, the single element 14 of Brown cannot properly be construed to correspond to the two separate claim limitations of a bottom face sheet and a fragment catching layer as set forth in claims 1 and 26. Accordingly, this ground of rejection is improper and should be reversed.

Regarding Rejection II:

Appellants respectfully submit that the rejection of claims 1-9, 12-14, 16, 18-21 and 23-38 as being anticipated by Groves also is in error and should be reversed.

Groves discloses a body armor structure made of an outer bullet-trapping component 11 and an inner impact spreading component 12.



Thus, contrary to the position of the Office action, Kevlar layers 31 of inner component 12 do not function as the claimed projectile arresting layer, as any incoming projectile is already arrested by outer component 11. The Office action conjectures that the inner layer 12 “would act as a projectile arresting layer to any incoming projectile that makes it through outer layer 11,” reasoning that if layer 11 stopped all incoming projectiles, there would be no point to having second layer 12. This supposition is incorrect, as Groves explicitly teaches that inner layer 12 is provided for the purpose of “spreading the impact of the bullet being trapped in the outer component 11.” See col. 6, line 67 – col. 7, line 1 (emphasis added).

Groves further explicitly teaches that “the outer component 11, which forms the bullet trap, may be used separate from the particular disclosed inner component ...”, col. 3, ll. 7-9. Groves nowhere discloses that inner component 12 could perform the function of a projectile arresting layer and thus the interpretation of inner component 12 as having such function is unfounded.

Further, bottom multilayer 33 also of Kevlar cannot correspond to the separately

claimed bottom face sheet and fragment catching layer. Groves teaches that multiple sheets of Kevlar cloth 33 as provided form a single functional inner layer 28, see col. 7, ll. 9-12. Groves does not disclose that one of the sheets of layer 28 functions as a face sheet while other sheets function as a fragment catching layer. Simply because the inner layer 28 is made up of a plurality of sheets of material, does not mean that the sheets have separate functionality. Groves teaches that the inner layer 28 of inner component 12 is made of four sheets of a high impact-resistant material. There is no basis in Groves for discriminating one of the sheets 33 as a bottom face sheet coupled to a fragment catching layer. Again, the only basis for doing so appears to be an attempt to read the present claims on Groves after having read the present application.

Further still, Groves fails to disclose an open cell core structure as claimed. The core 30 is disclosed as including two layers 34 and 35, each of which includes a plurality of closely-packed, closed chambers or domes 42 and 43. The domes 42 and 43 have their bases fixed to intermediate layer 36 and their tops in contact with outer layer 27. See col. 7, ll.12-31. The closed domes 42 contain plastic spheres 46, while the interstitial spaces between closed domes 43 contain plastic spheres 47. These structures do not correspond to an open cell core structure as required by the present claims.

The Office action states that “open dome shaped cells” 34 and 35 are relied on as meeting the claimed “open cell core structure.” Groves, however, discloses that each layer 34 and 35 includes a plurality of closely packed chambers or compartments 42, col. 7, ll. 12-16; 24-26, with bases in contact with intermediate layer 36 and inner layer 28. The domes are thus closed domes, and are not open cells as claimed.

The Office action asserts that it would not be possible to fill a core with particles if it were not an open cell core. This statement does not show that the closed domes 42 and 43 constitute an open cell core structure as claimed. The claimed structure is an open cell structure. Even if domes 42 and 43 at one point during the manufacture of the Groves armor component could be considered “open” in the sense that they are subsequently filled with particles 46, 47 and then are closed by being attached to layers 36 and 28, the fact remains that the manufactured armor component as disclosed contains closed chambers 42 and 43, while the claimed structure requires an open cell core. The closed, filled chambers are not open cell core structures as claimed. The claimed invention is to a finished device, and is not directed to a stage of manufacture.

For all of the foregoing reasons, as well as the fact that Groves fails to disclose the various features set forth in the dependent claims, it is submitted that Groves fails to anticipate any of claims 1-9, 12-14, 16, 18-21 or 23-38. Accordingly this ground of rejection should be reversed.

Regarding Rejection III:

Appellants respectfully submit that the rejection of 17 and 22 as being unpatentable over the proposed combination of Groves with Tippett under 35 U.S.C. § 103 is in error and also should be reversed.

The composite expansion joint material of Tippett is simply irrelevant to the claimed invention and irrelevant to Groves. One of ordinary skill in the art would not attempt to modify the Groves armor to include a material disclosed by Tippett as useful in an expansion joint. Therefore, there exists no apparent reason or purpose to the suggested combination other than an attempt to recreate the claimed invention. In any event, Tippett fails to cure the deficiency of Groves as demonstrated above with respect to the independent claims from which claims 17 and 22 depend, and thus even if the combination of Tippett with Groves were made, it could not result in the invention as set forth in claim 17 or claim 22.

Conclusion

The Honorable Board is requested to reverse all outstanding grounds of rejection and to direct the passage of this application to issue.

NOVAK DRUCE DELUCA + QUIGG, LLP  
1300 Eye St. N.W.  
Suite 1000 West  
Washington, D.C. 20005

Phone: (202) 659-0100  
Fax: (202) 659-0105

Date: April 1, 2008

Respectfully submitted,

NOVAK DRUCE DELUCA + QUIGG, LLP



Vincent M. DeLuca  
Registration No. 32,408

Attorney for Appellants

CLAIMS APPENDIX:

1. (Previously presented) A protection structure comprising:
  - open cell core structure;
  - a top face sheet coupled to said core structure;
  - a bottom face sheet coupled to said core structure distal from said top face sheet;
  - a projectile arresting layer coupled to said top face sheet distal from said core structure; and
  - a fragment catching layer coupled to said bottom face sheet distal from said core.
  
2. (Previously presented) A protection structure comprising:
  - open cell core structure;
  - a top face sheet coupled to said core structure;
  - a bottom face sheet coupled to said core structure distal from said top face sheet;
  - a projectile arresting structure disposed inside said core structure; and
  - a fragment catching layer coupled to said bottom face sheet distal from said core.
  
3. (Original) A protection structure comprising:
  - open cell core structure;
  - a top face sheet coupled to said core structure;
  - a bottom face sheet coupled to said core structure distal from said top face sheet;
  - a projectile arresting layer coupled to said top face sheet distal from said core structure; and
  - a fragment catching structure disposed inside said core.
  
4. (Original) The protection structure of claim 3, further comprising:
  - a projectile arresting structure disposed in said core structure.

5. (Previously presented) A protection structure comprising:
- open cell core structure;
  - a top face sheet coupled to said core structure;
  - a bottom face sheet coupled to said core structure distal from said top face sheet;
  - a projectile arresting layer coupled to said top face sheet distal from said core structure; and
  - a fragment catching structure disposed inside said core and a fragment catching layer coupled to said bottom face sheet distal from said core.
6. (Original) The protection structure of claim 5 further comprising:
- a projectile arresting structure disposed inside said core structure.
7. (Original) A protection structure comprising:
- open cell core structure;
  - a top face sheet coupled to said core structure;
  - a bottom face sheet coupled to said core structure distal from said top face sheet;
  - a projectile arresting structure disposed inside said core structure; and
  - a fragment catching structure disposed inside said core.
8. (Original) The structure of any one of claims 1-7, wherein said core comprises:
- at least one truss layer comprised of at least one truss unit.
9. (Previously presented) The structure of claim 8, wherein said at least one truss unit has a geometrical shape of at least one of: tetrahedral, pyramidal, Kagome, bilayer, trilayer, cone, frustum, or combinations thereof.
12. (Previously presented) The structure of any one of claims 1-7, wherein said core comprises:

at least one textile layer, said textile layer comprised of at least one array of intersecting structural support members forming apertures of predetermined geometric configurations.

13. (Original) The structure of claim 12, wherein said structural support members are at least one of tubular filaments or wire filaments, or combination thereof.

14. (Original) The structure of claim 12, wherein said structural support members are made from at least one of woven material, woven mesh, square woven mesh, rectangular woven mesh, multisided woven mesh, knitted mesh, braided mesh, triaxial mesh, biaxial mesh, or quasi-triaxial mesh, or combination thereof.

16. (Previously presented) The structure of any one of claims 1, 3, or 5 wherein said projectile arresting layer comprises at least one of tiles, ceramic tiles, applied layers, fiber reinforced, particular reinforced, rods, spheres, chemically hardening slurries, cubes and/or other geometric shapes self contained.

17. (Previously presented) The structure of any one of claims 1, 3, or 5 wherein said projectile arresting layer comprises ceramic or partial composites of ceramic or combination thereof.

18. (Previously presented) The structure of any one of claims 1, 2, or 5 wherein said fragment catching layer comprises at least one of fabric, Kevlar fabric, Spectra fabric, S2 glass fabric, and/or Zylon fabric, tape, Kevlar tape, Spectra tape, S2 glass tape, and/or Zylon tape.

19. (Previously presented) The structure of any one of claims 1, 2, or 5, wherein said fragment catching layer comprises at least one of fabric, Kevlar fabric, Spectra fabric, S2 glass fabric, and/or Zylon fabric, wherein any of said fabrics are infiltrated with a hardening resin.

20. (Previously presented) The structure of any one of claims 1, 2, or 5 wherein at-said fragment catching layer comprises Kevlar, partial composites of Kevlar, Spectra, partial composites of Spectra, S2 glass, partial composites of S2 glass, Zylon, and/or partial composites of Zylon or combination thereof.

21. (Previously presented) The structure of any one of claims 2, 4, 6, or 7 wherein said projectile arresting structure is selected from the group consisting of tape, ceramic tape, coating, fiber reinforced, particular reinforced, ceramic coating, powder, ceramic powder, partial composite of ceramic powder, ceramic fabric, and partial composite of ceramic fabric.

22. (Previously presented) The structure of any one of claims 2, 4, 6, or 7 wherein said projectile arresting structure is at least one material selected from the group consisting of ceramic and partial composites of ceramic and combination thereof.

23. (Previously presented) The structure of any one of claims 3, 4, 5, 6, or 7 wherein said fragment catching structure is selected from the group consisting of fabric, KEVLAR fabric, tape, KEVLAR tape, coating, KEVLAR coating, powder, KEVLAR powder, fabric, KEVLAR fabric, SPECTRA fabric, S2 glass fabric, ZYLON fabric, and combinations thereof.

24. (Previously presented) The structure of any one of claims 3, 4, 5, 6, or 7 wherein said fragment catching structure is selected from the group consisting of fabric, KEVLAR fabric, tape, and KEVLAR tape, wherein any of said fabrics and/or tape are infiltrated with a hardening resin.

25. (Previously presented) The structure of any one of claims 3, 4, 5, 6, or 7 wherein at least one of said fragment catching structure is selected from the group consisting of Kevlar or partial composites of Kevlar, Spectra, partial composites of Spectra, S2 glass, partial composites of S2 glass, Zylon, partial composites of Zylon, and combinations thereof.

26. (Original) A method of making a protection structure comprising:
- providing an open cell core structure;
  - coupling a top face sheet to said core structure;
  - coupling a bottom face sheet to said core structure distal from said top face sheet;
  - coupling a projectile arresting layer to said top face sheet distal from said core structure; and
  - coupling a fragment catching layer to said bottom face sheet distal from said core.
27. (Original) A method of making a protection structure comprising:
- providing an open cell core structure;
  - coupling a top face sheet to said core structure;
  - coupling a bottom face sheet to said core structure distal from said top face sheet;
  - disposing a projectile arresting structure inside said core structure; and
  - coupling a fragment catching layer to said bottom face sheet distal from said core.
28. (Original) A method of making a protection structure comprising:
- providing an open cell core structure;
  - coupling a top face sheet to said core structure;
  - coupling a bottom face sheet to said core structure distal from said top face sheet;
  - coupling a projectile arresting layer to said top face sheet distal from said core structure; and
  - disposing a fragment catching structure inside said core.
29. (Previously presented) The method of claim 28, further comprising:
- disposing a projectile arresting structure in said core structure.

30. (Previously presented) A method of making a protection structure comprising:

- providing an open cell core structure;

- coupling a top face sheet to said core structure;

- coupling a bottom face sheet to said core structure distal from said top face sheet;

- coupling a projectile arresting layer to said top face sheet distal from said core structure; and

- disposing a fragment catching structure inside said core and a fragment catching layer coupled to said bottom face sheet distal from said core.

31. (Previously presented) The method of claim 30 further comprising:

- disposing a projectile arresting structure inside said core structure.

32. (Previously presented) A method of making a protection structure comprising:

- providing an open cell core structure;

- coupling a top face sheet to said core structure;

- coupling a bottom face sheet to said core structure distal from said top face sheet;

- disposing a projectile arresting structure inside said core structure; and

- disposing a fragment catching structure inside said core structure.

33. (Previously presented) The protection structure of claim 7, further comprising:

- a projectile arresting layer coupled to said top face sheet distal from said core structure.

34. (Previously presented) The protection structure of claim 33, further comprising:

- a fragment catching layer coupled to said bottom face sheet distal from said core.

35. (Previously presented) The protection structure of claim 7, further comprising:  
a fragment catching layer coupled to said bottom face sheet distal from said core.

36. (Previously presented) The method of claim 32, further comprising:  
coupling a projectile arresting layer to said top face sheet distal from said core structure.

37. (Previously presented) The method of claim 36, further comprising:  
coupling a fragment catching layer to said bottom face sheet distal from said core structure.

38. (Previously presented) The method of claim 32, further comprising:  
coupling a fragment catching layer to said bottom face sheet distal from said core structure.

EVIDENCE APPENDIX:

None.

RELATED PROCEEDINGS APPENDIX:

None.